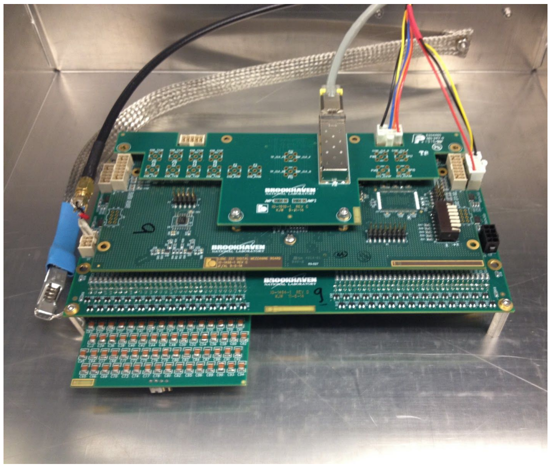
How to setup the test stand

1. Make sure the low voltage power supplies are plugged into the analog board and the FPGA mezzanine board.



2. Make sure the coax cable from CH1 of the waveform generator is plugged the 4 (red) and 5 (black) pins of U1 on the analog board.

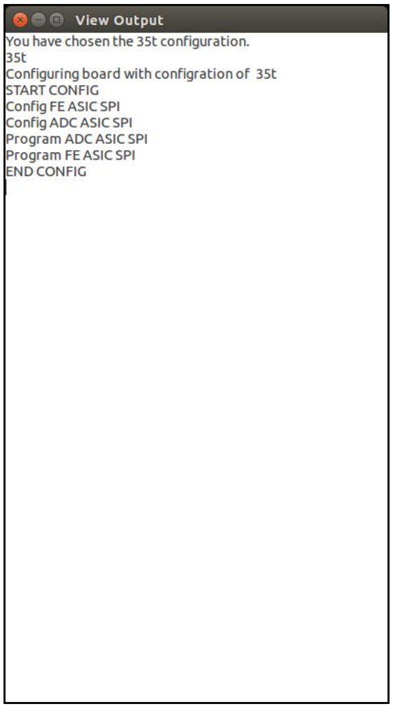
3. Make sure the ethernet from the board is plugged into the back of the computer.

4. The board should look like the picture to the right.

5. Turn on low voltage power supplies. You should see:
    a. Upper power supply:
       CH1: 3.6V CH2: 1.5V CH3: 2.8V
    b. Lower power supply:
       CH1: 5V CH2: 1.85V CH3: 5V

6. Turn on the LV output. You should see:
    a. Upper power supply:
       CH1: 0.37A CH2: 0.40A CH3: 0.38A
    b. Lower power supply:
       CH1: 0.01A CH2: <1.0A CH3: 0.02A (on first power up)

7. Log into computer as user “*workshop*” and open terminal.



```
You have chosen the 35t configuration.
35t
Configuring board with configration of  35t
START CONFIG
Config FE ASIC SPI
Config ADC ASIC SPI
Program ADC ASIC SPI
Program FE ASIC SPI
END CONFIG
```

8. cd femb_udp

9. Type in the command line: **python init_femb.py 35t**

10. The output of this script will print to the terminal. It should look something similar to the image to the right.

11. Now look at the current draw on CH2 of the lower power supply. It should have increased to 1.06A if the FEMB configured properly.

12. **You are now ready to do some testing**.

Live Feed Viewing

1. In command line type: **python live_feed_gui.py**

2. A window labeled “*Config window*” will open. This will have a drop down menu where you can choose the board configuration you would like.

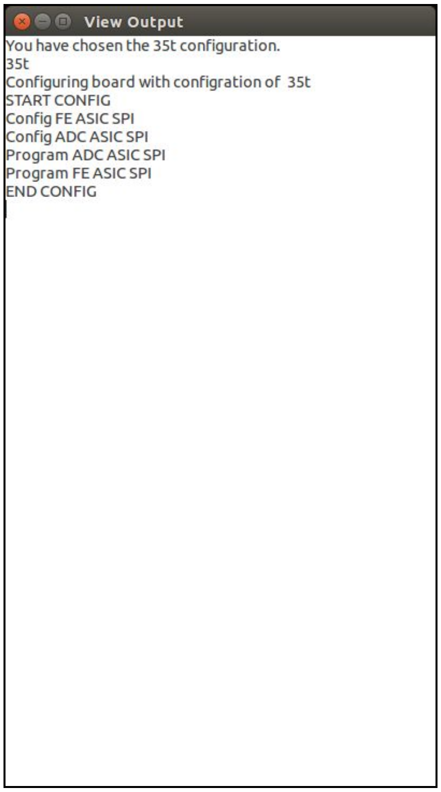
3. You should choose “*35t*” as the configuration. This GUI also works with a “*adcTest*” configuration.

4. Once you have chosen the correct configuration, click “*Board Config*”.

5. A new window called “*Live Feed*” will open.

6. After this you will need to look at the “*Config Window”* and click the button that says “*Init Board*”. This will initialize the board with the correct configuration.

7. An additional window called “*View Output*” will pop up and tell you what configuration you picked and show the output after configuring the board. A “normal” output should look something like the image to the right.



```
You have chosen the 35t configuration.
35t
Configuring board with configration of  35t
START CONFIG
Config FE ASIC SPI
Config ADC ASIC SPI
Program ADC ASIC SPI
Program FE ASIC SPI
END CONFIG
```

8. The “*Live Feed”* window will have a “*Plot Data*” button and a “*Plot FFT*” button in the left column. The default ASIC is set to 0 and the default channel is set to 0.

9. To look at the plot of a specific channel's waveform you have to choose the channel number from the drop down menu in the right column. Once you have done this click “*Select Channel*”. This will pop up another output window to confirm the channel you selected.

10. Once you click “*Select Channel*”, you can now go and click “*Plot Data*” or “*Plot FFT*” to view the live feed of this channel. The plots will run continuously until you click ‘X’ to close the window. Until you hit ‘X’ you cannot select any other buttons from within the GUI.

<u>Exercise</u>

a. *Select channel 1 of the waveform generator*
b. *Choose the following setup: Sine Wave, frequency: 100 kHz, amplitude: 200 mV peak to peak centered at 0.*
c. *Select ASIC 0, channel 0 from the "Live Feed" window*
d. *Click "Plot Data"*
e. *Turn on output on signal generator and view the plots*
f. *Turn off output*
g. *Click 'X' on the plotting window*
h. *Click "Plot FFT"*
i. *Turn on output on the signal generator and view the plots*
j. *Cycle through different frequencies from 100kHz to 1 MHz*
k. *Turn off output*

11. Once you are done you can just click "X" on one of the two main windows to close out the GUI.

<u>Python Exercise</u>

A useful tool to have within the GUI is a way to test and see if all the channels are working on one ASIC by eye. We don't want to do a long test if one channel isn't working right away. This button will be a good preliminary test.

<u>Goal:</u>
We want to have a button in the Live Feed GUI where it will loop over all the different channels on the selected ADC and plot the waveform for a certain amount of time and then the next channel will open after.

The scripts you will need to understand to do this exercise are:

- Pyroot_plot.py
- Select_channel.py
- Live_feed_gui.py